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Inclusive education and students without special educational needs

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Background: In the debate on inclusive education, students without special educational needs (SEN) are an important topic. However, there is a lot unknown about differences between these typical students in inclusive and non-inclusive classes. For example, the neutral results that are often found in earlier research could be caused by positive effects for some students, and negative effects for others.
Purpose: This study investigated whether there is a relation between inclusive education and the academic achievement and socio-emotional functioning of typical students, and, more importantly, whether inclusive education affects the achievement and socio-emotional functioning of more and less intelligent typical students differently. Furthermore, we investigated whether differences occur by type of SEN of the included students. Here, we made a distinction between students with behavioural, cognitive and other problems.
Sample: A representative sample of 27,745 students without SEN in Dutch primary education from a large cohort study in the Netherlands was used.
Design and methods: Language and arithmetic tests were used to assess academic achievement. For socio-emotional functioning, both teacher and student questionnaires were used. A non-verbal IQ test was used to assess student intelligence. Based on the number of students with diagnosed SEN, the students without SEN were divided into several groups: typical students with no, a few and more than a few students with (certain types of) SEN in their class. Multi-level regression analyses were used to compare these groups.
Results: For academic achievement, no differences were found between students without SEN in inclusive and non-inclusive classes. In this, we found no differences between intelligent and less intelligent typical students. For socio-emotional functioning, some differences were found, but the practical importance of these differences is unclear, since the effect sizes were small. The functioning of typical students does not meaningfully differ by type of SEN of the included students.
Conclusions: The findings of this study are interesting in the light of the ongoing inclusion debate. Arguments against inclusive education often concern an assumed adverse effect on typical students. As in this study, hardly any differences were found between typical students in inclusive and non-inclusive primary school classes, this research strengthens the scientific evidence in support of inclusive education.

Keywords: inclusive education; special educational needs; typical students; academic; socio-emotional

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Introduction

Since the 1990s, there has been a clear international trend towards inclusive education (Ainscow and César 2006; Meijer 2004; Smeets 2007), which can broadly be defined as educating children with special educational needs (SEN) in regular schools instead of in special schools. In this paper, we have used a narrower definition in which inclusive education involves educating children with SEN in regular classes. Together with the introduction of policies towards inclusive education, there has been a fierce debate about the desirability of this trend. In this debate, many of the arguments focus on the influence on students without SEN, to whom we will also refer as 'typical' students.

When focusing on students without SEN, it can be reasoned that inclusive education can have both negative and positive effects on academic achievement. On the one hand, children with SEN could take up more of the teacher's attention at the expense of 'typical' children, the general level of education in the class might be lowered and children with SEN might distract the other children in the class. On the other hand, there might be positive academic effects because more adaptive education is used and there are more teacher assistants in classes with SEN students. Regarding socio-emotional effects, it could be reasoned that children without SEN in inclusive classes become more aware and less anxious about differences between people. They might also develop fewer prejudices against and more friendships with children with SEN. On the other hand, children without SEN could copy undesirable behaviour from children with SEN.

In this paper, we investigate whether there is a relationship between inclusive education and the academic and socio-emotional functioning of typical students. In this, we will make a distinction between more and less intelligent 'typical' children, and the inclusion of students with behavioural, cognitive and other problems.

Inclusion and academic achievement of students without SEN

A considerable amount of research has been done on the academic effects of inclusive education on children without SEN, with mixed results. Staub and Peck (1994) summarised some early literature on the academic effects of inclusive education on children without SEN, from which they concluded that inclusive education has no effect on the achievement of children without SEN. A decade later, Pijl, Nakken and Mand (2003) drew a similar conclusion from their literature review, that there is no evidence for inclusive education having a detrimental effect on the achievement of students without SEN, and that some studies even find positive effects. In a recent review of 26 studies, Kalambouka and others (2007) mostly found positive or neutral effects of inclusive education: 58% of the cited studies reported positive effects and 23% reported neutral effects. However, most of these studies were relatively small scale, often based on research in one or only a few schools.

Dyson and others (2004) performed a large-scale study into the effects of inclusion on the achievement of students without SEN. At regional level, they found no relationship between the inclusiveness of the Local Educational Authority and achievement. At school level, a small effect was found: in schools with higher levels of inclusion, student achievements were on average lower. Nevertheless, other background characteristics, such as entitlement to free school meals or mother tongue, proved more important and, according to the authors, the effect found was

very small. In another large-scale study, though the amount of explained variance was very small, a slightly positive effect of inclusive education on the achievement of typical children was found (Demeris, Childs, and Jordan 2007). In a third large-scale study, Gandhi (2007) found no general difference in reading performance between non-disabled students in inclusive and non-inclusive classes. When more specific aspects were investigated, for most comparisons, there were also no differences between non-disabled students in inclusive and non-inclusive classes.

Ruijs and Peetsma (2009) described a major shortcoming in earlier research, which is that no distinction is made between different groups of typical students in the vast majority of studies. Nevertheless, it is possible that different groups of typical students could be affected differently. For instance, intelligent children might benefit. If children with SEN require more teacher attention, teachers could make more use of independent working for the other students (Meijer 2001), which could enable intelligent children to make more progress in inclusive education because they do not have to 'wait' for their classmates. Moreover, if teachers need to cater for more varied needs and achievement levels in inclusive classes, they might make more use of adaptive education or ability grouping (Houtveen and Van de Grift 2001; Peschar and Meijer 1997), which might have an adverse effect on less intelligent students who end up in groups with other weak pupils (Houtveen et al. 1999). Alternatively, teachers might lower the general level of education to cater for the children with SEN (Gerber 1995; Huber, Rosenfeld, and Fiorello 2001). This might benefit less intelligent children, because they would have less difficulty keeping up with the lessons. In the scientific literature, only two studies made a distinction between different groups of typical students. Dumke (1991, cited in Pijl, Nakken, and Mand 2003) found more high-achieving and more poor-achieving students without SEN in inclusive classes. The variance in inclusive classes was higher than in non-inclusive classes, indicating that there might be a positive effect for intelligent children and a negative effect for less intelligent children. Huber, Rosenfeld, and Fiorello (2001), on the other hand, found no differences between classes with and without children with SEN, but did find that an inclusive curriculum benefits low-achieving students.

Although ambiguous, these findings support the idea that there might be a differential effect of inclusive education for more and less intelligent students. This is a very important point to note, because the frequently found neutral results could be caused by positive effects for some students and negative effects for others. When one group achieves better and another group achieves worse, the average will be neutral. In this study, therefore, we first investigated whether there was any relation between inclusive education and the academic achievement of children without SEN, and second, whether this relation was different for more and less intelligent typical students.

Inclusion and socio-emotional functioning of students without SEN

Far less research has been done on the socio-emotional effects of inclusive education on children without SEN. The research available mostly indicates positive effects of inclusive education on contacts with and attitudes towards students with SEN: children in inclusive classes have fewer prejudices about children with SEN, they are more willing to play with them and they have a more positive attitude towards them (Nakken and Pijl 2002; Salend and Garrick Duhaney 1999; Staub and Peck 1994).

Nevertheless, Brown (1982, cited in Kalambouka et al. 2007) found a negative social effect of inclusive education. He found that inclusion of children with behavioural problems influenced the classroom climate and the learning environment in a negative way. Staub and Peck (1994), on the other hand, found no evidence that students without SEN learn undesirable behaviour from students with SEN. In a recent study, Wong (2008) found no differences in attitude towards people with disabilities between non-disabled students in inclusive and non-inclusive classes in a secondary school in Hong Kong. A programme aimed at acceptance of people with disabilities, however, did positively change participants' social acceptance of children with disabilities.

Less is known about the effects of inclusive education on other socio-emotional factors, such as self-confidence, teacher–student relationship and well-being. To our knowledge, these factors have not been investigated before, while it is possible that inclusive education could also influence these socio-emotional aspects. For example, typical students in inclusive education might feel better about themselves, because they can compare themselves with students with SEN who generally achieve less well (downward comparison), and this might increase their sense of well-being (Wills 1981). Furthermore, there might be more acceptance of diversity in inclusive classes. On the other hand, it could be reasoned that inclusive education could have a negative effect on the socio-emotional functioning of typical students, as they might receive less attention from the teacher, because the SEN students demand more intensive teacher support (Peck et al. 2004). Another possibility is that teachers might experience more stress in inclusive classes (Forlin 2001; Forlin, Hattie, and Douglas 1996), which could adversely affect teacher–student relationships (Yoon 2002). In this study, we investigated the relation between inclusive education and the socio-emotional functioning of typical students. Because this might also vary between more and less intelligent students, we also made this distinction in our analysis of socio-emotional functioning.

Inclusive education and different types of SEN

Another problem with earlier research is that most studies did not investigate whether the inclusion of children with different types of SEN has different effects on typical students. Earlier studies focused on students with various types of SEN; Cole, Waldron and Majd (2004), for example, investigated the effects of including children with learning disabilities and mild mental disabilities, and McDonnell and others (2003) investigated the effects of including children with intellectual or multiple disabilities. However, neither study investigated whether these different types of SEN affect typical students differently. Gandhi (2007) distinguished between students with different types of SEN, and did indeed find a few different effects of the inclusion of children with different types of SEN on non-disabled children. Children with autism, for instance, seemed to adversely effect the reading performance of non-disabled children, if the classroom did not have a teacher assistant. This indicates that there might be differences in the effects of inclusion of students with different types of SEN. This seems intuitive, because a child with autism generally has different needs from a child with dyslexia, and a child with attention-deficit hyperactivity disorder (ADHD) will probably behave differently from a child with internalising problem behaviour. For this reason, children with different types of SEN might have a very different influence on typical students. In this study, we investigated whether the

relation between inclusive education and the academic and socio-emotional functioning of typical students differs when children with different types of SEN are included. Our research distinguished between children with behavioural, cognitive or other problems.

Research questions

To summarise, the research questions investigated in this study were:

(1) Is there a relationship between inclusive education and the achievement and socio-emotional functioning of students without SEN?;
(2) Does this relationship differ for more and less intelligent typical students?;
(3) Does the relationship between inclusive education and the academic; and socio-emotional functioning of typical students differ by the type of SEN of the included students?

The Dutch educational context

Because the Dutch education system is quite different from the situation in other Western countries, it is important to point out the most important differences within the context of this paper. Dutch children attend primary education from the age of four to 12, in a year group system. In this paper, we refer to grades as years, with year 1 referring to four-year-olds, and year 8 referring to 12-year-olds. There are no official recommendations concerning class size, although most primary schools have class sizes of about 20–25 students (Eurydice 2009).

Since 1917, public and private schools are equally funded by the government. This means that denominational schools (Catholic, Protestant, etc.) and special programme schools (Montessori, Steiner) are publicly funded at the same level as public schools (provided schools comply with certain quality standards). Besides that, parents are generally free to choose schools for their children, and are not restricted by measures such as catchment areas. As a consequence, only a very small number of Dutch students are educated at privately funded schools.

Regarding special and inclusive education, special schools coexist next to inclusive education; 95% of all 4–12-year-old children attend regular primary education schools. There are two general types of special education in the Netherlands. The first one concerns 'special primary schools' (*speciaal basisonderwijs*), which are meant for students with moderate learning and/or behavioural difficulties, learning difficulties and developmental difficulties. About 3% of the children in primary education attend these schools. Another 2% attend 'special schools', which are meant for students with more severe difficulties, such as severe social, emotional and behavioural problems or physical or cognitive impediments.

Since the 1990s, there have been policies geared towards including children with SEN in mainstream primary schools. Because of the distinction between 'special' and 'special primary' schools, inclusion is funded in two ways. First, there are fixed budgets for consortia of regular and special primary schools, which are meant for funding special facilities at regular primary schools. Second, parents and regular primary schools can apply for a pupil-bound-budget ('Rugzakje' or 'Backpack') to fund the additional support needed to educate children with more

severe problems in regular classes instead of in special schools. This funding is meant for students who would otherwise be eligible to go to the special schools, and is awarded by a regional committee. There are no special classes in mainstream schools, so students are either included in a regular class, or educated in a special (primary) school. The use of the Backpack funding depends on the needs of the child. For children with physical problems, material changes to the building can be funded. Also, specialist support for the child or for the teacher and hiring a teacher assistant can be funded.

Method

Participants

Data from a Dutch cohort study, named PRIMA, were used to investigate the research questions. The PRIMA-cohort study is a biennial study of over 55,000 students in Dutch primary education. Data are available on background variables, such as gender, parental education and ethnicity, on achievement in language and arithmetic, on intelligence, and on socio-emotional variables such as well-being, teacher–student relationship and self-confidence. 42,068 students in the PRIMA-cohort study form a representative sample of Dutch primary school students. The remaining students participated in an additional sample, which is designed to obtain more information on disadvantaged student groups. In our research, we only used the representative sample.

Data from the sixth measurement of PRIMA were used, which were collected in the 2004/2005 school year (Driessen, Van Langen, and Vierke 2006). Schools were selectively approached to obtain a representative sample and 420 schools participated. Special schools were not included in this wave of PRIMA. Students from the years 2, 4, 6 and 8 of Dutch primary education took part in the study. Information was obtained throughout the school year; student tests were administered in the period January–March 2005.

For 10,127 of the 42,068 children (24.1%), it was not known whether they had SEN or not, because not all teachers filled out the questionnaire with information on the special needs of their students. In missing value analysis, the children whose SEN status was unknown proved to score somewhat lower on language and behaviour and a little higher on self-reported social integration, but the effect sizes of these differences were very small ($r = 0.016$ to $r = 0.045$). Some differences on the background characteristics were found, but these effect sizes were also small ($\eta_p^2 = 0.001$ to $\eta_p^2 = 0.029$), and so these children were omitted from the analysis without compromising the representativeness of the sample. Because of the research questions, only children *without* SEN were included in the analyses.

Because of the way the PRIMA data is organised, two different samples were used in answering the research questions. In the PRIMA-cohort study, data on intelligence are available for years 4, 6 and 8. When only these years are used, about a quarter of the data is omitted. To avoid losing power in the analyses on including children with different types of SEN, we chose to use two samples: one sample, without year 2, for the first two research questions and one sample, with year 2, for the third research question. Because the student-reports on socio-emotional functioning are only available for years 6 and 8, we only used these years when analysing the student-reports.

Sample 1

In the first sample, in which we used the data on intelligence, and therefore did not take year 2 into account, there were some missing values on the background variables. There were a number of differences between children with and without missing values, but the effect sizes of these differences were very small to medium: on the continuous variables, 83.3% were below $r = 0.25$, and on the discrete variables, all effect sizes were below $\eta_p^2 = 0.02$. Despite these differences, children with missing values were omitted from the analysis because there were significant differences on a small number of variables. After this, 19,127 children without SEN in 1196 classes and 330 schools remained for the analysis of the first two research questions. On the dependent variables, there were also some missing values, especially on the teacher-reports on socio-emotional functioning (26.0–26.7%). This substantial percentage of missing values in the teacher-reports was caused by the design of the study. To avoid a heavy workload on the teachers, some teachers were asked to fill out their questionnaire for a randomly selected sample of students. Again, there were some differences between children with and without missing values, but the effect sizes of these differences were very small to medium. On the continuous variables, 82.1% were below $r = 0.25$, and on the discrete variables all effect sizes were below $\eta_p^2 = 0.01$. Despite these differences, analyses were run with the available cases on each variable.

Sample 2

In the second sample, we also analysed students in year 2. This sample was used for the third research question on differences by type of SEN, and the outcomes of the missing value analysis are very much comparable to sample 1. After omitting the children with missing values on the background variables, 27,745 children without SEN in 1852 classes and 336 schools remained for the analyses. As with sample 1, the analyses were run with the available cases on each variable. For both samples, the exact numbers of students per analysis are given in the tables, and student characteristics of this sample are summarised in Table 1.

Instruments

Background characteristics

In earlier research, background characteristics such as gender, ethnicity and parental education proved important for student development (Dyson et al. 2004; Ma and Klinger 2000; Peetsma et al. 2006). That is why we included relevant background characteristics in our research. Information on these background characteristics was obtained through school records as a part of the PRIMA-cohort study. The background characteristics taken into account in this study were: gender, number of students per school, ethnicity, parental education and urbanisation. We also controlled for differences between years by standardisation of the dependent variables within years.

The students were divided into six ethnic background groups: (1) Moroccan; (2) Turkish; (3) Surinamese/Antillean (these are the three largest minority groups in the Netherlands); (4) native Dutch; (5) mixed Dutch/non-Dutch; and (6) other

Table 1. Student characteristics of Sample 1 and Sample 2.

	Sample 1		Sample 2	
	$n = 19{,}127$		$n = 27{,}745$	
	Percentage	Mean (SD)	Percentage	Mean (SD)
Age				
Year 2			26.8%	5.8 (0.38)
Year 4	35.2%	7.9 (0.44)	25.9%	7.9 (0.44)
Year 6	32.5%	9.9 (0.47)	23.8%	9.9 (0.47)
Year 8	32.3%	11.9 (0.47)	23.6%	11.9 (0.48)
Gender				
Boys	48.3%		49.0%	
Girls	51.7%		51.0%	
Ethnicity				
Other	4.4%		4.6%	
Moroccan	3.7%		3.8%	
Turkish	4.2%		4.2%	
Surinamese/Antillean	2.0%		2.1%	
Mixed Dutch/non-Dutch	5.4%		5.6%	
Dutch	80.3%		79.8%	
Parental education				
Max. primary education	6.3%		6.5%	
Max. lower vocational education	19.2%		19.2%	
Max. vocational education	40.5%		40.6%	
Max. higher education	34.0%		33.7%	
Urbanisation				
Other	62.3%		61.8%	
Rural	19.8%		19.8%	
G27	11.6%		12.0%	
G4	6.3%		6.4%	
Number of students per school		273.9 (152.9)		272.5 (152.8)

SD, standard deviation.

backgrounds. Parental education was defined by the highest type of education attended by the highest educated parent. Parental education was divided into four categories: (1) higher education; (2) vocational education; (3) lower vocational education; and (4) primary education or no education at all. Urbanisation was divided into four categories: (1) the four largest cities in the Netherlands (G4); (2) the next 27 largest cities in the Netherlands (G27); (3) rural areas; and (4) other cities and villages.

Language and arithmetic tests

To assess the academic functioning of students without SEN, standardised tests for language and arithmetic were used (PRIMA and CITO[1]). In practice, most schools already used these tests to track student achievement. Reliability of the tests proved to be good for language, KR-20 $\geq$ 0.80 (KR-20 is a reliability measure for measures with dichotomous choices, analogous to Cronbach's alpha; Driessen 2004; Driessen and Withagen 1999) and arithmetic (Janssen and Engelen 2002; van Kuyk and Kamphuis 2001). Because of the large differences in age and educational attainment between years, different tests were used for each year. Individual student scores were

standardised within years to be able to compare achievement across years. We used the relative position of each student compared to other students in that year in the analyses.

Teacher questionnaire on socio-emotional functioning

To measure socio-emotional functioning, teacher-reports and student-reports were used. In their questionnaire, teachers assessed 19 statements about each student on a five-point scale. The questionnaire measured six aspects of socio-emotional functioning: self-confidence (e.g. 'This student is easily upset'); teacher–student relationship (e.g. 'This student has a difficult relationship with me'); effort (e.g. 'This student soon thinks that his work is done'); popularity (e.g. 'This student is popular among classmates'); well-being at school (e.g. 'This student would rather avoid school'); and behaviour at school (e.g. 'This student is often impudent').

In earlier research, the reliability of this questionnaire has proved to be good: the alphas of the different subscales are between 0.81 and 0.89 (Driessen, Van Langen, and Vierke 2002). Student scores were standardised within years, because younger students usually score better on measures of socio-emotional functioning. Standardisation makes it possible to compare the socio-emotional functioning of children in different years.

Student questionnaire on socio-emotional functioning

In addition to the teacher questionnaire, we used a student questionnaire to measure socio-emotional functioning. Because younger students were not yet able to fill out self-report questionnaires, the student questionnaire was only available for years 6 and 8. Using only this questionnaire would halve the available data and cause loss of power, which is why we also used the teacher-reports. To see whether the teacher observations concurred with student experiences, we also used the student-reports.

The student questionnaire consisted of 17 statements measuring three aspects of socio-emotional functioning: self-confidence on schoolwork (e.g. 'I am one of the best students in my class'); well-being at school (e.g. 'I feel at ease with my teacher'); and social integration in the class (e.g. 'I have few friends in this class'; neg.). Students assessed each statement on a five-point scale, ranging from 'this is completely untrue' to 'this is completely true'.

Reliability of this questionnaire proved to be satisfactory to good: $\alpha = 0.75$ for self-confidence, $\alpha = 0.69$ for well-being and $\alpha = 0.78$ for social integration (Driessen, Van Langen, and Vierke 2002). In this questionnaire, student scores were also standardised within years.

Teacher questionnaire on students with SEN

To determine whether students with SEN were present in regular classes, teachers were asked to fill in a questionnaire on each student with SEN in their class. They were defined as students with an individualised education plan, students that needed a specific approach or additional help and/or students with a specific problem or disability. In the questionnaire, teachers were presented with 30 problems and were asked to report which problems the student had. In addition, teachers were asked to

report whether the student had been formally diagnosed with each of the reported problems. For Dutch teachers, an official diagnosis refers to a problem that has been diagnosed by a person or a committee who is qualified to do so, such a psychiatrist, psychologist or a regional committee that decides about additional funds for students with SEN. Only the students with a formal diagnosis were considered students with SEN in this study ($n = 1839$).

SEN were divided into three categories of problems: (1) cognitive problems ($n = 1147$), which included developmental delay, language and arithmetic difficulties, dyslexia and dyscalculia; (2) behavioural problems ($n = 497$), which included autism, problems with making an effort at school and externalising problem behaviour; and (3) other problems ($n = 528$), including physical disabilities, internalising problem behaviour and gifted children. Gifted children were classified as having other problems, because the cognitive problems category contained children whose cognitive development is slower than normal, whereas gifted children develop cognitively faster than average and generally have other accompanying problems. While children with autism can display a broad range of social, communicational and behavioural problems (Mash and Wolfe 2005), we included them in the category behavioural problems, because the behavioural problems are most likely to stand out in a regular classroom. This is supported by our data: similarly to children with (mean $= -1.06$, SD $= 1.07$) and without (mean $= -0.13$, SD $= 1.02$, $t(1445) = 12.512$, $p < 0.01$, $r = 0.313$) externalising problem behaviour, such as ADHD, children with autism (mean $= -0.62$, SD $= 1.19$) scored lower on teacher-reported behaviour at school than children with other types of SEN (mean $= -0.23$, SD $= 1.06$, $t(1445) = 4.276$, $p < 0.01$, $r = 0.112$). The three categories of problems were not necessarily mutually exclusive. When children had diagnoses in more than one category, they were included in all applicable categories of problems, because children were likely to have the needs and display the behaviour belonging to the different types of SEN. There were a total of 229 students with diagnoses in two categories, and 52 students with diagnoses in all three categories.

To determine the relation between inclusion and functioning of typical students, the percentage of SEN students per class was calculated. Instead of using this as a continuous variable, different groups were created. This facilitates interpretation and accounts for possible nonlinearities between the different groups. We decided to make a distinction between typical students with no students with SEN in their class, a few students with SEN in their class, and more than a few students with SEN in their class. For the first two research questions, in which we used sample 1 (without year 2), it was decided to use a 10% boundary between the 'few students with SEN' and 'more than a few students with SEN' group. This boundary was chosen to have a substantial number of students in the three groups. The numbers are shown in Table 2.

In the third research question, we investigate different types of SEN and distinguish students with behavioural, cognitive and other problems. Similarly to the first two research questions, three groups are compared: typical students in classes with no, one and 'one or more' students with (a specific type of) SEN. Because the group of students with SEN is divided between students with behavioural, cognitive and other problems, the boundary between the different groups was adjusted to 5%. When a 10% boundary would have been used, the number of typical children in classes with more students with that type of SEN would become too small.

Table 2. Descriptive statistics on the number of typical students and special educational needs students in the different SEN and percentage categories.

	Total number of students		Average percentage of SEN students per class		Average number of SEN students per class	
	Non-SEN	SEN*	Mean	SD	Mean	SD
Sample 1	19,127	1433				
None	7467					
Less than 10%	7585	519	6.32%	2.10	1.34	0.53
More than 10%	4075	914	18.38%	7.33	3.09	1.55
Sample 2	27,745	1839				
Behavioural						
None	21,243					
Less than 5%	3324	144	4.02%	0.62	1.00	0.00
More than 5%	3178	353	10.16%	5.05	1.45	0.72
Cognitive						
None	16,976					
Less than 5%	3529	151	4.12%	0.61	1.00	0.00
More than 5%	7240	996	12.61%	7.54	1.99	1.30
Other						
None	21,327					
Less than 5%	3105	137	4.08%	0.64	1.00	0.00
More than 5%	3313	391	10.99%	5.87	1.47	0.75

*Notes: SEN (special educational needs) students are not taken into account in the analyses, only the percentage of students with SEN in a class is used. SD, standard deviation.

From sample 2, we first created a variable indicating whether students with SEN were present ($n = 15{,}480$) or absent ($n = 12{,}265$) in a class. After that, three variables were created: one variable indicated whether there were no, less than 5% or more than 5% students with behavioural problems in a class. One variable indicated whether there were no, less than 5% or more than 5% children with cognitive problems in a class. The third variable indicated whether there were no, less than 5% or more than 5% children with other problems in a class. Multicollinearity between these variables showed to be no issue: the correlations range from -0.69 to 0.25.

Descriptive statistics on the number and percentage of (SEN) students in each of these categories are reported in Table 2. As the means and standard deviations show, the less than 5% students with SEN category only included classes with one student with that type of SEN, and more than 5% meant one or more students with SEN, depending on the class size.

IQ

Student intelligence was measured by two nonverbal intelligence tests: composing figures and exclusion (Driessen, Van Langen, and Vierke 2006). For the composing figures test, children were presented with a series of five abstract figures. The first figure is a geometric shape, for example a square, from which a part has been omitted. One of the four other figures is the part that has been omitted and the children have to identify this part. This subtest requires spatial understanding. The exclusion test consists of series of four abstract figures. Three figures belong together

and children have to choose the figure that does not belong to the other three. This subtest requires spatial understanding and the ability to reason. The scores of the tests were added to obtain one total score. The complete test consisted of 40 multiple-choice items for year 4, 41 for year 6 and 46 for year 8. The reliability of this test was satisfactory, $\alpha = 0.78$ for year 4, $\alpha = 0.74$ for year 6 and $\alpha = 0.73$ for year 8 (Van Batenburg and Van Der Werf 2004).

As stated earlier, the IQ test was only administered to children in years 4, 6 and 8. Because IQ scores are already standardised, we did not standardise IQ across years. Children in year 4 did achieve somewhat better than children in years 6 and 8 ($F(2, 19124) = 416.1$, $p < 0.001$), but the effect size of this difference was small to medium: $r = 0.20$.

To compare the effects of inclusive education on more and less intelligent typical students, low-achieving children were defined as children scoring more than 1 SD below the mean ($n = 2816$), and high-achieving children were defined as children scoring more than 1 SD above the mean ($n = 2843$). The other students ($n = 13{,}468$) were considered of average intelligence. We used these three categories instead of a continuous measure of IQ to account for non-linear effects and to make the results more interpretable.[2]

Assumptions

After analysing missing values, common assumptions in data analysis were checked. First, there proved to be no problematic univariate or multivariate outliers. Second, there were no severe deviances from normality; some variables were a little skewed, but this was no threat to the validity of the analyses. Furthermore, multicollinearity proved to be no problem.

Analyses

To investigate the research questions, multi-level regression analyses were used. In regular regression analysis, an important assumption is that observations are independent from each other. In this study, however, the samples consisted of children in the same classes and schools. Because children in the same class and school are more similar than children from different classes and schools, observations were not independent from each other. With multi-level regression analysis, it is possible to control for these effects. We distinguished school level, class level and student level. To investigate whether multi-level regression analyses are indeed appropriate, intra-class correlations and fit improvements (through χ^2 difference statistics) were investigated.

Because two different samples were used, the analyses were performed in two series. First, we investigated the first two research questions, on the relation between inclusive education and the achievement and socio-emotional functioning of students without SEN, and on whether this varies between more and less intelligent typical students. After that, we investigated the third research question, on whether the academic and socio-emotional effects of inclusive education on typical students differ when students with different types of SEN are included. For all 11 dependent variables (language, arithmetic; teacher-reported self-confidence, teacher–student relation, effort, popularity, well-being, behaviour; student-reported self-confidence, well-being and social integration), separate stepwise analyses were carried out.

In the first series of analyses, we used sample 1, the sample without year 2. For each of the dependent variables, five models were computed. The first model (Model 0) was the reference model. This model did not contain explanatory variables, but estimated what proportion of the total variance of the dependent variable was student-bound, class-bound and school-bound. Model 1 was a model with background variables only. Except for number of students per school, we used dummy variables to calculate the effects of these variables. The reference groups were boys for gender, Dutch children for ethnicity, higher education for parental education and children in the four largest cities (G4) for urbanisation. In Model 2, IQ was added to Model 1 and average achieving students were the reference group. In Model 3, the presence of students with SEN was added to Model 2 and students in classes without SEN students were the reference group. In the final model (Model 4) the interaction effect of IQ and the presence of students with SEN was added to Model 3. A χ^2 value was calculated for each model to test whether the model differed significantly from the previous one. So, Model 1 was tested against Model 0, Model 2 was tested against Model 1, and so on.

In the second series of analyses, sample 2, with year 2, was used. As in the first series of analyses, the first two models (Model 0 and Model 1) consisted of a reference model and a model with background variables only. In the final model (Model 2), four variables were added to Model 1: the variable indicating whether there were students with SEN present in a class, and the variables indicating whether there were no, less than 5% or more than 5% students with behavioural, cognitive or other problems in a class. On all SEN variables, the reference groups were typical students in classes without students with SEN. A χ^2 value was calculated for each model to test whether the model differed significantly from the previous one.

Results

Differences between more and less intelligent typical students in inclusive and non-inclusive classes

In the analysis without year 2, similarities between children from the same classes and schools were confirmed: intra-class correlations ranged from $r = 0.03$ for student-reported self-confidence to $r = 0.31$ for teacher-reported teacher–student relationship. Eight out of the 11 intra-class correlations were equal to or above $r = 0.10$, indicating that multi-level regression analysis was appropriate. This was supported by the fit results for class level: for all variables, χ^2 difference statistics indicated significantly better fit at $\alpha = 0.05$. For school level, the same was true, except for teacher- and student-reported self-confidence.[3] For these measures, the fit of the empty model (Model 0) with school and class level was not significantly different from the fit of the same model with class level only. That is why school level was not taken into account for self-confidence on either the teacher or student questionnaires.

Language and arithmetic

Table 3 shows no differences in language and arithmetic between typical students in classes without students with SEN, in classes with less than 10% students with SEN and in classes with more than 10% students with SEN. Besides that, no interaction effect of IQ and the presence of students with SEN on language and arithmetic was

Table 3. Differences in language and arithmetic between typical students in inclusive and non-inclusive classes.

	Language					Arithmetic				
	$n = 18{,}966$					$n = 18{,}303$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
Variance										
School	0.09	0.01	0.01	0.01	0.01	0.07	0.02	0.01	0.01	0.01
Class	0.06	0.06	0.05	0.06	0.05	0.10	0.10	0.09	0.09	0.09
Student	0.82	0.76	0.72	0.72	0.72	0.81	0.74	0.65	0.65	0.65
Total	0.97	0.83	0.79	0.79	0.79	0.97	0.86	0.75	0.75	0.75
Division of variance										
School	9.5%					6.9%				
Class	6.1%					10.1%				
Student	84.5%					83.0%				
% Explained variance		14.95%	19.34%	19.34%	19.35%		11.65%	22.39%	22.40%	22.43%
Intercept	ns	0.20*	0.22**	0.21**	0.22**	ns	0.37**	0.39**	0.38**	0.39**
Gender (Ref = boy)		0.06**	0.05**	0.05**	0.05**		−0.31**	−0.33**	−0.33**	−0.33**
No. of students per school		ns	ns	ns	ns		ns	ns	ns	ns
Ethnicity (Ref = Dutch)										
Other		−0.45**	−0.43**	−0.43**	−0.43**		−0.16**	−0.14**	−0.14**	−0.14**
Moroccan		−0.48**	−0.42**	−0.42**	−0.42**		−0.30**	−0.20**	−0.20**	−0.20**
Turkish		−0.85**	−0.82**	−0.82**	−0.82**		−0.37**	−0.32**	−0.32**	−0.32**
Surinamese/Antillean		−0.35**	−0.29**	−0.29**	−0.29**		−0.38**	−0.28**	−0.28**	−0.29**
Mixed		−0.19**	−0.18**	−0.18**	−0.18**		−0.16**	−0.15**	−0.15**	−0.15**
Parental education (Ref = higher ed.)										
Primary ed.		−0.60**	−0.51**	−0.51**	−0.51**		−0.57**	−0.44**	−0.44**	−0.44**
Lower voc. ed.		−0.57**	−0.49**	−0.49**	−0.49**		−0.54**	−0.43**	−0.43**	−0.43**
Voc. ed.		−0.29**	−0.25**	−0.25**	−0.25**		−0.27**	−0.21**	−0.21**	−0.21**
Urbanisation (Ref = G4)										
Other		0.16*	0.13*	0.13*	0.13*		0.16†	0.13†	0.13†	0.13†
Rural		0.17*	0.14†	0.14†	0.14†		0.17†	ns	ns	ns
G27		ns	ns	ns	ns		ns	ns	ns	ns

(*continued*)

Table 3. (*Continued*).

	Language					Arithmetic				
	$n = 18{,}966$					$n = 18{,}303$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
IQ (Ref = average IQ)										
Low IQ			−0.44**	−0.44**	−0.45**			−0.67**	−0.67**	−0.71**
High IQ			0.33**	0.33**	0.29**			0.55**	0.55**	0.53**
SEN (Ref = no students with SEN)				ns	ns				ns	ns
SEN × IQ					ns					ns
Fit (−2 log likelihood)	51424.3	49651.0	48675.7	48675.3	48672.2	49470.4	47817.9	45382.3	45381.9	45372.4
χ^2 Difference Test		1773.3**	975.3**	0.4^{ns}	3.1^{ns}		1652.5**	2435.6**	0.4^{ns}	9.5†
df		13	2	2	4		13	2	2	4

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

found. This indicates that effects of inclusive education did not differ for more and less intelligent typical students. When looking at the background variables, all variables except the number of students per school were found to be related to the achievement in language and arithmetic. For example, girls scored higher than boys on language, whereas boys scored higher than girls on arithmetic, and Dutch children scored higher on both tests than non-Dutch children. IQ significantly improved both models: as might be expected, more intelligent children scored higher on language and arithmetic than children with an average IQ, whereas children with a low IQ scored lower on both measures than children with an average IQ.

Teacher-reports on socio-emotional functioning

The presence of children with SEN was not significantly related to teacher-reported self-confidence and teacher–student relationship of children without SEN: there were no differences between typical students in classes without students with SEN, typical students in classes with less than 10% students with SEN and typical students in classes with more than 10% students with SEN (Table 4). In addition, this relation did not differ for more and less intelligent typical students: the interaction effect of intelligence and the presence of students with SEN did not significantly predict self-confidence and teacher–student relationship of typical students. The background variables were found to be less important for teacher-reported socio-emotional variables. Table 4 shows, for example, that non-Dutch children displayed rather more self-confidence than Dutch children, and girls had a better teacher–student relationship than boys. The amount of explained variance of the background variables was quite low: 0.68% for self-confidence and 3.24% for teacher–student relationship. IQ significantly improved both models: children with a higher IQ had more self-confidence and a better teacher–student relationship than children with an average IQ, whereas children with a low IQ had less self-confidence and a less positive teacher–student relationship than children with an average IQ.

As Table 5 shows, there were no differences in teacher-reported effort and popularity between typical students in classes without students with SEN, typical students in classes with less than 10% students with SEN and typical students in classes with more than 10% students with SEN. This indicates that, according to the teacher, the presence of students with SEN was not significantly related to effort and popularity of typical students. However, there was a significant interaction effect of intelligence and the presence of students with SEN on effort: students with a high IQ and less than 10% students with SEN in their class showed more teacher-reported effort than children with an average IQ and no students with SEN in their class (est. 0.104, SE = 0.051, $t = 2.056$, $p = 0.040$). However, the model fit did not significantly improve, the amount of explained variance increased by only 0.04% and the effect size was $d = 0.106$, which can be classed as small (Cohen 1988). There was no significant interaction effect of IQ and the presence of students with SEN on popularity. Most background variables were found to be significant predictors of teacher-reported effort and popularity. For example, girls made more effort and were more popular than boys, and children whose parents had attended higher education made more effort and were more popular than children of less well-educated parents. For popularity, however, the amount of explained variance was rather small: 1.67%. IQ significantly improved

Table 4. Differences in self-confidence and teacher–student relationship between typical students in inclusive and non-inclusive classes.

	Self-confidence					Teacher–student relation				
	$n = 14{,}017$					$n = 14{,}044$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
Variance										
School	n/a	n/a	n/a	n/a	n/a	0.02	0.01	0.01	0.00	0.00
Class	0.17	0.17	0.17	0.17	0.17	0.28	0.29	0.29	0.29	0.29
Student	0.79	0.78	0.78	0.78	0.78	0.66	0.64	0.64	0.64	0.64
Total	0.96	0.95	0.95	0.95	0.95	0.97	0.93	0.93	0.93	0.93
Division of variance										
School	n/a					1.8%				
Class	18.1%					29.4%				
Student	81.9%					68.8%				
% Explained variance		0.68%	1.00%	1.05%	1.09%		3.24%	3.41%	3.54%	3.58%
Intercept	0.03†	ns	ns	ns	ns	ns	−0.24*	−0.24*	−0.23†	−0.23†
Gender (Ref = boy)		ns	ns	ns	ns		0.27**	0.27**	0.27**	0.27**
No. of students per school		0.00**	0.00**	0.00**	0.00**		0.00†	0.00†	0.00*	0.00*
Ethnicity (Ref = Dutch)										
Other		0.18**	0.18**	0.18**	0.18**		−0.11*	−0.11*	−0.11*	−0.11*
Moroccan		0.17**	0.19**	0.19**	0.19**		−0.21**	−0.20**	−0.21**	−0.21**
Turkish		0.14*	0.15*	0.15*	0.15*		ns	ns	ns	ns
Surinamese/Antillean		0.18*	0.20**	0.20**	0.20**		ns	ns	ns	ns
Mixed		0.08†	0.08†	0.08†	0.08†		−0.10*	−0.10*	−0.10*	−0.10*
Parental education (Ref = higher ed.)										
Primary ed.		ns	ns	ns	ns		−0.09†	ns	ns	−0.07†
Lower voc. ed.		−0.12**	−0.10**	−0.10**	−0.10**		−0.15**	−0.13**	−0.13**	−0.13**
Voc. ed.		−0.07**	−0.06**	−0.06**	−0.06**		−0.10**	−0.10**	−0.010**	−0.10**
Urbanisation (Ref = G4)										
Other		ns	ns	ns	ns		ns	ns	ns	ns
Rural		ns	ns	ns	ns		0.23†	0.22†	0.22†	0.23†
G27		ns	ns	ns	ns		ns	ns	ns	ns

(*continued*)

Table 4. (*Continued*).

	Self-confidence					Teacher–student relation				
	$n = 14{,}017$					$n = 14{,}044$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
IQ (Ref = average IQ)										
Low IQ			−0.11**	−0.10**	−0.08†			−0.07**	−0.07**	ns
High IQ			0.08**	0.08**	ns			0.07**	0.07**	ns
SEN (Ref = no students with SEN)				ns	ns				ns	ns
SEN × IQ					ns					ns
Fit (−2 log likelihood)	37870.3	37788.5	37748.1	37745.6	37738.0	36231.4	35746.0	35718.3	35714.3	35707.7
χ^2 Difference Test		81.8**	40.4**	2.5^{ns}	7.6^{ns}		485.4**	27.7**	4.0^{ns}	6.6^{ns}
df		13	2	2	4		13	2	2	4

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

Table 5. Differences in effort and popularity between typical students in inclusive and non-inclusive classes.

	Effort					Popularity				
	$n = 14{,}026$					$n = 14{,}028$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
Variance										
School	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Class	0.08	0.08	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Student	0.88	0.79	0.76	0.76	0.76	0.85	0.84	0.84	0.84	0.84
Total	0.96	0.88	0.85	0.85	0.85	0.95	0.93	0.93	0.93	0.93
Division of variance										
School	1.2%					1.0%				
Class	7.9%					8.9%				
Student	90.9%					90.1%				
% Explained variance		8.39%	11.40%	11.44%	11.48%		1.67%	1.98%	2.02%	2.02%
Intercept	0.03*	−0.20*	−0.18*	−0.20*	−0.19*	0.04*	ns	ns	ns	ns
Gender (Ref = boy)		0.50**	0.48**	0.48**	0.48**		0.11**	0.10**	0.10**	0.10**
No. of students per school		0.00**	0.00*	0.00*	0.00*		ns	ns	ns	ns
Ethnicity (Ref = Dutch)										
Other		0.08†	0.10†	0.10†	0.10†		ns	ns	ns	ns
Moroccan		ns	ns	ns	ns		−0.17**	−0.16**	−0.16**	−0.16**
Turkish		ns	ns	ns	ns		ns	ns	ns	ns
Surinamese/Antillean		ns	ns	ns	ns		ns	ns	ns	ns
Mixed		−0.11**	−0.10*	−0.10*	−0.10*		−0.11*	−0.11*	−0.10*	−0.10*
Parental education (Ref = higher ed.)										
Primary ed.		−0.36**	−0.29**	−0.29**	−0.29**		−0.20**	−0.18**	−0.18**	−0.18**
Lower voc. ed.		−0.37**	−0.30**	−0.30**	−0.30**		−0.24**	−0.22**	−0.22**	−0.22**
Voc. ed.		−0.17**	−0.13**	−0.13**	−0.13**		−0.12**	−0.11**	−0.11**	−0.11**
Urbanisation		ns	ns	ns	ns		ns	ns	ns	ns
IQ (Ref = average IQ)										
Low IQ			−0.37**	−0.37**	−0.38**			−0.13**	−0.13**	−0.15**
High IQ			0.30**	0.30**	0.28**			0.06*	0.06*	ns

(*continued*)

Table 5. (*Continued*).

	Effort					Popularity				
	$n = 14{,}026$					$n = 14{,}028$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
SEN (Ref = no students with SEN)										
>10% students with SEN				ns	ns				ns	ns
<10% students with SEN				ns	ns				ns	ns
SEN × IQ										
Low IQ* > 10% SEN					ns					ns
Low IQ* < 10% SEN					ns					ns
High IQ* > 10% SEN					ns					ns
High IQ* < 10% SEN					$0.10^{\dagger}$					ns
Fit (−2 log likelihood)	38843.4	37543.2	37019.7	37017.1	37008.9	38518.6	38315.5	38270.3	38267.6	38267.2
χ^2 Difference Test		1300.2**	523.5**	2.6^{ns}	8.2^{ns}		203.1**	45.2**	2.7^{ns}	0.4^{ns}
df		13	2	2	4		13	2	2	4

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

both models: again, children with a high IQ made more effort and were more popular than children with an average IQ, and children with a low IQ made less effort and were less popular than children with an average IQ.

Finally, no differences were found on teacher-reported well-being and behaviour between typical students in classes without students with SEN, typical students in classes with less than 10% students with SEN and typical students in classes with more than 10% students with SEN (Table 6). Moreover, according to the teachers, effects of inclusive education on well-being and behaviour did not vary between more and less intelligent typical students: there was no significant interaction effect of IQ and the presence of students with SEN. The background variables had a significant relation with well-being and behaviour. For example, girls showed more well-being and better behaviour than boys, and children whose parents had attended higher education showed more well-being and better behaviour than children of less well-educated parents. IQ significantly predicted both variables: children with a high IQ showed more well-being and better behaviour than children with an average IQ, and children with a low IQ show less well-being and poorer behaviour than children with an average IQ.

Student-reports on socio-emotional functioning

The student-reports showed no differences in social integration and well-being between typical students in classes without students with SEN, in classes with less than 10% students with SEN and in classes with more than 10% students with SEN (Table 7). Furthermore, there was no interaction effect of IQ and the presence of students with SEN on social integration and well-being. This indicates that according to students, effects of inclusive education on social integration and well-being were no different for more and less intelligent typical students. Some of the background variables were found to be significantly related to social integration and well-being. For example, Dutch background students scored higher on social integration than students from Turkish, mixed or other backgrounds, and children whose parents had attended higher education scored higher on well-being than children whose parents had attended primary, lower vocational or vocational education. However, the amount of explained variance of the background variables was quite low: $R^2 = 0.98\%$ for social integration and $R^2 = 3.25\%$ for well-being. Intelligence significantly improved both models: children with a low IQ scored lower on social integration and well-being than children with an average IQ.

As Table 8 shows, there were differences in student-reported self-confidence between typical students in classes without students with SEN and typical students in classes with more than 10% students with SEN. Students in classes with more than 10% SEN students reported more self-confidence than students in classes without students with SEN (est. 0.098, SE = 0.029, $t = 3.411$, $p = 0.001$). While the fit of the model significantly improved, the effect size and the increase in explained variance were small: $d = 0.099$ and $R^2 = 0.17\%$ (Cohen 1988). This difference was not found for typical students in classes with less than 10% students with SEN compared with typical students in classes without students with SEN. There was no significant interaction effect of intelligence and the presence of students with SEN on student-reported self-confidence. This indicates that effects of the presence of SEN students were no different for more and less intelligent

Table 6. Differences in well-being and behaviour between typical students in inclusive and non-inclusive classes.

	Well-being					Behaviour				
	$n = 14{,}040$					$n = 14{,}157$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
Variance										
School	0.02	0.01	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Class	0.24	0.24	0.24	0.24	0.24	0.11	0.12	0.12	0.12	0.12
Student	0.68	0.66	0.66	0.66	0.66	0.83	0.78	0.77	0.77	0.77
Total	0.94	0.91	0.90	0.90	0.90	0.96	0.89	0.89	0.89	0.89
Division of variance										
School	1.8%					1.7%				
Class	25.3%					11.8%				
Student	72.9%					86.6%				
% Explained variance		3.26%	3.87%	3.94%	3.98%		6.86%	7.33%	7.34%	7.41%
Intercept	0.04†	−0.18†	ns	−0.18†	−0.18†	ns	−0.34**	−0.33**	−0.32**	−0.33**
Gender (Ref = boy)		0.26**	0.25**	0.25**	0.25**		0.41**	0.40**	0.40**	0.40**
No. of students per school		0.00**	0.00*	0.00**	0.00**		0.00**	0.00**	0.00**	0.00**
Ethnicity (Ref = Dutch)										
Other		0.14**	0.14**	0.14**	0.14**		ns	ns	ns	ns
Moroccan		ns	0.11†	0.11†	0.11†		−0.35**	−0.33**	−0.33**	−0.33**
Turkish		0.16**	0.17**	0.17**	0.17**		ns	ns	ns	ns
Surinamese/Antillean		ns	ns	ns	ns		−0.13†	ns	ns	ns
Mixed		ns	ns	ns	ns		−0.07†	ns	ns	−0.07†
Parental education (Ref = higher ed.)										
Primary ed.		−0.19**	−0.16**	−0.16**	−0.16**		−0.25**	−0.22**	−0.22**	−0.22**
Lower voc. ed.		−0.25**	−0.22**	−0.22**	−0.22**		−0.25**	−0.22**	−0.22**	−0.22**
Voc. ed.		−0.12**	−0.10**	−0.10**	−0.10**		−0.12**	−0.11**	−0.11**	−0.11**
Urbanisation (Ref = G4)										
Other		ns	ns	ns	ns		0.19*	0.18*	0.18*	0.18*
Rural		ns	ns	ns	ns		0.22**	0.20*	0.21*	0.21*
G27		ns	ns	ns	ns		0.13†	ns	ns	ns

(*continued*)

Table 6. (*Continued*).

	Well-being					Behaviour				
	$n = 14{,}040$					$n = 14{,}157$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
IQ (Ref = average IQ)										
Low IQ			−0.15**	−0.15**	−0.12**			−0.13**	−0.13**	−0.11**
High IQ			0.13**	0.13**	0.10*			0.11**	0.11**	0.10*
SEN (Ref = no students with SEN)				ns	ns				ns	ns
SEN × IQ					ns					ns
Fit (−2 log likelihood)	36455.8	35975.1	35871.0	35868.4	35863.0	38744.1	37781.2	37712.4	37711.9	37700.7
χ^2 Difference Test		480.7**	104.1**	2.6^{ns}	5.4^{ns}		962.9**	68.8**	0.5^{ns}	$11.2^{\dagger}$
Δdf		13	2	2	4		13	2	2	4

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

Table 7. Differences in self-reported social integration and well-being between typical students in inclusive and non-inclusive classes.

	Social integration (student)					Well-being (student)				
	$n = 12{,}219$					$n = 12{,}292$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
Variance										
School	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02
Class	0.04	0.04	0.04	0.04	0.04	0.11	0.11	0.11	0.11	0.11
Student	0.92	0.91	0.91	0.91	0.91	0.84	0.81	0.81	0.81	0.81
Total	0.96	0.95	0.95	0.95	0.95	0.98	0.95	0.94	0.94	0.94
Division of variance										
School	1.2%					2.2%				
Class	3.7%					11.5%				
Student	95.1%					86.2%				
% Explained variance		0.98%	1.06%	1.08%	1.10%		3.25%	3.33%	3.33%	3.36%
Intercept	ns	ns	ns	ns	ns	ns	−0.20†	−0.20†	−0.20†	−0.20†
Gender (Ref = boy)		ns	ns	ns	ns		0.33**	0.33**	0.33**	0.32**
No. of students per school		ns	ns	ns	ns		0.00*	0.00*	0.00*	0.00*
Ethnicity (Ref = Dutch)										
Other		−0.15**	−0.15**	−0.15**	−0.15**		ns	ns	ns	ns
Moroccan		ns	ns	ns	ns		0.22**	0.23**	0.23**	0.23**
Turkish		−0.17*	−0.17*	−0.16*	−0.16*		ns	ns	ns	ns
Surinamese/Antillean		ns	ns	ns	ns		ns	ns	ns	ns
Mixed		−0.10†	−0.10†	−0.10†	−0.10†		ns	ns	ns	ns
Parental education (Ref = higher ed.)										
Primary ed.		−0.16**	−0.15**	−0.15**	−0.15**		−0.16**	−0.15**	−0.15**	−0.15**
Lower voc. ed.		−0.13**	−0.12**	−0.12**	−0.12**		−0.13**	−0.12**	−0.12**	−0.12**
Voc. ed.		−0.08**	−0.08**	−0.08**	−0.08**		−0.05†	−0.04†	−0.04†	−0.05†
Urbanisation (Ref = G4)		ns	ns	ns	ns		ns	ns	ns	ns
IQ (Ref = average IQ)										
Low IQ			−0.06†	−0.06†	−0.09†			−0.05†	−0.05†	ns
High IQ			ns	ns	ns			ns	ns	ns

(*continued*)

Table 7. (*Continued*).

	Social integration (student)					Well-being (student)				
	$n = 12{,}219$					$n = 12{,}292$				
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 0	Model 1	Model 2	Model 3	Model 4
SEN (Ref = no students with SEN)				ns	ns				ns	ns
SEN × IQ					ns					ns
Fit (−2 log likelihood)	34027.2	33950.7	33944.0	33941.8	33938.3	33702.0	33272.1	33264.3	33264.3	33260.0
χ^2 Difference Test		76.5**	$6.7^{\dagger}$	2.2^{ns}	3.5^{ns}		429.9**	$7.8^{\dagger}$	0.0^{ns}	4.3^{ns}
df		13	2	2	4		13	2	2	4

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

Table 8. Differences in self-reported self-confidence between typical students in inclusive and non-inclusive classes.

	Self-confidence (student)				
	$n = 12{,}296$				
	Model 0	Model 1	Model 2	Model 3	Model 4
Variance					
Class	0.03	0.03	0.03	0.03	0.03
Student	0.94	0.89	0.86	0.86	0.86
Total	0.97	0.93	0.89	0.89	0.89
Division of variance					
Class	3.0%				
Student	97.0%				
% Explained variance		4.83%	8.17%	8.34%	8.35%
Intercept	0.05**	0.65**	0.68**	0.64**	0.64**
Gender (Ref = boy)		−0.24**	−0.25**	−0.25**	−0.25**
No. of students per school		ns	0.00†	ns	ns
Ethnicity (Ref = Dutch)					
Other		ns	ns	ns	ns
Moroccan		ns	0.13†	0.14†	0.14†
Turkish		ns	ns	ns	ns
Surinamese/Antillean		ns	ns	ns	ns
Mixed		ns	ns	ns	ns
Parental education (Ref = higher ed.)					
Primary ed.		−0.41**	−0.34**	−0.34**	−0.34**
Lower voc. ed.		−0.50**	−0.44**	−0.43**	−0.44**
Voc. ed.		−0.29**	−0.26**	−0.26**	−0.26**
Urbanisation (Ref = G4)					
Other		−0.23**	−0.25**	−0.24**	−0.24**
Rural		−0.24**	−0.27**	−0.27**	−0.27**
G27		−0.14†	−0.15*	−0.14†	−0.14†
IQ (Ref = average IQ)					
Low IQ			−0.39**	−0.40**	−0.40**
High IQ			0.38**	0.38**	0.38**
SEN (Ref = no students with SEN)					
>10% students with SEN				0.10**	0.11**
<10% students with SEN				ns	ns
SEN × IQ					ns
Fit (−2 log likelihood)	34484.8	33857.5	33397.0	33384.8	33381.4
χ^2 Difference Test		627.3**	460.5**	12.2*	3.4 ns
df		13	2	2	4

**$p \leq 0.001$, *$p \leq 0.01$, †$p \leq 0.05$, ns, non-significant; SEN, special educational needs.

students without SEN. The background variables were found to be related to student-reported self-confidence: children whose parents had attended higher education, for example, scored higher on self-confidence than children whose parents had attended primary, lower vocational or vocational education. Intelligence significantly improved the model as well: children with a high IQ scored higher on self-confidence than children with an average IQ, and children with a low IQ scored lower on self-confidence than children with an average IQ.

Differences between typical students in classes with students with behavioural, cognitive or other problems

As explained in the method section, a different sample was used for the third research question. Except for the addition of year 2 students, this sample was very similar to the sample used for the first two questions, so there is no need to describe the background variables again. This information can of course be found in the tables.

In the analysis on the inclusion of students with different types of SEN, similarities between children from the same classes and schools were confirmed again: intra-class correlations ranged from $r = 0.03$ for student-reported self-confidence to $r = 0.32$ for teacher-reported teacher–student relationship. Eight out of the 11 intra-class correlations were equal to or above $r = 0.10$. This meant that multi-level regression analysis was appropriate. This was supported by the fit results for class level. For all dependent variables, χ^2 difference statistics indicated significantly better fit at $\alpha = 0.05$. The same was true for school level, except for student-reported self-confidence.[4] For teacher-reported behaviour, however, the initial analyses yielded a non-positive definite Hessian Matrix. These problems were overcome when school level was taken out of the analysis. Consequently, school level was not taken into account for behaviour and student-reported self-confidence.

Language and arithmetic

Table 9 shows that the presence of students with SEN was no significant predictor of the achievement in language and arithmetic of typical students. Furthermore, there were no differential effects for including students with different types of SEN: there were no differences between typical students in classes with no, less than 5% and more than 5% students with behavioural, cognitive and other problems. There seemed, therefore, to be no relation between the inclusion of students with different types of SEN and typical students' achievement in language and arithmetic.

Teacher-reports on socio-emotional functioning

A similar picture was found for teacher-reported self-confidence, teacher–student relationship and effort (Table 10). According to the teachers, there were no differences between typical students in classes with and without students with SEN and there were no differences between typical students in classes with no, less than 5% and more than 5% students with behavioural, cognitive and other problems. There seemed, therefore, to be no relation between the inclusion of students with different types of SEN and teacher-reported self-confidence, teacher–student relationship and effort of typical students.

The findings also showed no differences in teacher-reported popularity, well-being and behaviour between typical students in classes with and without students with SEN (Table 11). Nor were any differences found between typical students in classes with no, less than 5% and more than 5% students with behavioural, cognitive and other problems. This indicates that, according to the teachers, there seemed to be no relation between the inclusion of students with different types of SEN and the popularity, well-being and behaviour of typical students.

Table 9. Differences in language and arithmetic for typical students in classes with students with behavioural, cognitive or other problems.

	Language			Arithmetic		
	$n = 26{,}030$			$n = 25{,}771$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Variance						
School	0.10	0.02	0.02	0.06	0.02	0.02
Class	0.08	0.07	0.07	0.10	0.10	0.10
Student	0.80	0.75	0.75	0.82	0.76	0.76
Total	0.99	0.83	0.83	0.98	0.89	0.89
Division of variance						
School	10.6%			6.6%		
Class	7.8%			10.4%		
Student	81.6%			83.0%		
% Explained variance		15.35%	15.37%		9.95%	10.06%
Intercept	ns	0.15†	0.15†	0.04†	0.37**	0.34**
Gender (Ref = boy)		0.07**	0.07**		−0.22**	−0.22**
No. of students per school		ns	ns		ns	ns
Ethnicity (Ref = Dutch)						
Other		−0.48**	−0.48**		−0.23**	−0.23**
Moroccan		−0.51**	−0.51**		−0.32**	−0.32**
Turkish		−0.85**	−0.85**		−0.39**	−0.39**
Surinamese/Antillean		−0.40**	−0.40**		−0.37**	−0.38**
Mixed		−0.20**	−0.20**		−0.16**	−0.16**
Parental education (Ref = higher ed.)						
Primary ed.		−0.58**	−0.57**		−0.54**	−0.54**
Lower voc. ed.		−0.53**	−0.53**		−0.53**	−0.53**
Voc. ed.		−0.26**	−0.26**		−0.27**	−0.27**
Urbanisation (Ref = G4)						
Other		0.19**	0.20**		0.14†	0.15†
Rural		0.21**	0.21**		0.13†	0.13†
G27		ns	ns		ns	ns
Student with SEN in class			ns			ns
Student with behavioural problems			ns			ns
Student with cognitive problems			ns			ns
Students with other problems			ns			ns
Fit (−2 log likelihood)	70198.7	67896.3	67894.3	70024.0	68194.2	68185.9
χ^2 Difference Test		2302.4**	2.0^{ns}		1829.8**	8.3^{ns}
Δdf		13	7		13	7

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

Student-reports on socio-emotional functioning

For student-reported social integration and self-confidence, again no differences were found between typical students in classes with and without students with SEN (Table 12). Furthermore, there were no differences between typical students in classes with no, less than 5% and more than 5% students with behavioural, cognitive or other problems. This indicates that, according to typical students, there was no relation between the inclusion of students with different types of SEN and their

Table 10. Differences in self-confidence, teacher–student relationship and effort for typical students in classes with students with behavioural, cognitive or other problems.

	Self-confidence			Teacher–student relationship			Effort		
	$n = 21{,}360$			$n = 21{,}377$			$n = 21{,}360$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Variance									
School	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Class	0.14	0.15	0.15	0.29	0.30	0.30	0.07	0.08	0.08
Student	0.81	0.80	0.80	0.66	0.64	0.64	0.89	0.81	0.81
Total	0.96	0.96	0.96	0.98	0.95	0.95	0.97	0.89	0.89
Division of variance									
School	1.1%			1.9%			1.0%		
Class	15.0%			30.1%			7.4%		
Student	83.9%			68.0%			91.5%		
% Explained variance		0.49%	0.61%		2.87%	2.93%		7.78%	7.81%
Intercept	ns	−0.14†	ns	ns	−0.27**	−0.31**	0.03*	−0.20**	−0.22**
Gender (Ref = boy)		ns	ns		0.27**	0.27**		0.48**	0.48**
No. of students per school		0.00†	0.00†		0.00†	0.00†		0.00*	0.00*
Ethnicity (Ref = Dutch)									
Other		0.19**	0.19**		−0.07†	−0.07†		0.10*	0.10*
Moroccan		0.21**	0.21**		−0.13**	−0.13**		ns	ns
Turkish		0.18**	0.18**		−0.07†	−0.07†		ns	ns
Surinamese/Antillean		0.16**	0.16**		ns	ns		ns	ns
Mixed		0.09*	0.09*		−0.07*	−0.07*		−0.06†	−0.06†
Parental education (Ref = higher ed.)									
Primary ed.		−0.07†	−0.07†		−0.12**	−0.12**		−0.36**	−0.36**
Lower voc. ed.		−0.10**	−0.10**		−0.14**	−0.14**		−0.36**	−0.36**
Voc. ed.		−0.07**	−0.07**		−0.09**	−0.09**		−0.18**	−0.18**

(*continued*)

Table 10. (*Continued*).

	Self-confidence			Teacher–student relationship			Effort		
	$n = 21{,}360$			$n = 21{,}377$			$n = 21{,}360$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Urbanisation (Ref = G4)									
Other		0.15*	$0.15^{\dagger}$		$0.18^{\dagger}$	0.19*		$0.11^{\dagger}$	$0.11^{\dagger}$
Rural		$0.13^{\dagger}$	$0.13^{\dagger}$		$0.20^{\dagger}$	0.20*		ns	ns
G27		ns	ns		ns	ns		ns	ns
Student with SEN in the class			ns			ns			ns
Student with behavioural problems			ns			ns			ns
Student with cognitive problems			ns			ns			ns
Students with other problems			ns			ns			ns
Fit (−2 log likelihood)	58129.8	58020.0	58011.1	55209.3	54535.9	54533.3	59362.4	57541.2	57537.6
χ^2 Difference test		109.8**	8.9^{ns}		673.4**	2.6^{ns}		1821.2**	3.6^{ns}
Δdf		13	7		13	7		13	7

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

Table 11. Differences in popularity, well-being and behaviour for typical students in classes with students with behavioural, cognitive or other problems.

	Popularity			Well-being			Behaviour		
	$n = 21{,}361$			$n = 21{,}396$			$n = 21{,}592$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Variance									
School	0.01	0.01	0.01	0.02	0.01	0.01	n/a	n/a	n/a
Class	0.09	0.09	0.09	0.25	0.26	0.26	0.12	0.11	0.11
Student	0.86	0.85	0.85	0.69	0.67	0.67	0.85	0.80	0.80
Total	0.96	0.94	0.94	0.96	0.93	0.93	0.97	0.92	0.92
Division of variance									
School	1.2%			1.7%			n/a		
Class	8.9%			26.5%			12.5%		
Student	89.9%			71.8%			87.5%		
% Explained variance		1.77%	1.87%		2.62%	2.71%		5.53%	5.59%
Intercept	0.04*	ns	ns	ns	−0.18†	−0.19†	ns	−0.26**	−0.30**
Gender (Ref = boy)		0.12**	0.12**		0.24**	0.24**		0.38**	0.38**
No. of students per school		0.00†	0.00†		0.00*	0.00*		0.00**	0.00**
Ethnicity (Ref = Dutch)									
Other		−0.09*	−0.09*		0.11**	0.11**		ns	ns
Moroccan		−0.18**	−0.18**		0.12**	0.12**		−0.27**	−0.27**
Turkish		−0.09†	−0.09†		0.12**	0.12**		ns	ns
Surinamese/Antillean		ns	ns		ns	ns		ns	ns
Mixed		−0.09*	−0.09*		ns	ns		−0.06†	−0.06†
Parental education (Ref = higher ed.)									
Primary ed.		−0.22**	−0.22**		−0.20**	−0.20**		−0.22**	−0.22**
Lower voc. ed.		−0.24**	−0.24**		−0.22**	−0.22**		−0.22**	−0.22**
Voc. ed.		−0.10**	−0.10**		−0.11**	−0.11**		−0.12**	−0.12**
Urbanisation (Ref = G4)									
Other		ns	ns		ns	ns		0.15**	0.15**
Rural		ns	ns		ns	ns		0.15*	0.15*
G27		ns	ns		ns	ns		ns	ns

(*continued*)

Table 11. (*Continued*).

	Popularity			Well-being			Behaviour		
	$n = 21{,}361$			$n = 21{,}396$			$n = 21{,}592$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Student with SEN in the class			ns			ns			ns
Student with behavioural problems			ns			ns			ns
Student with cognitive problems			ns			ns			ns
Students with other problems			ns			ns			ns
Fit (−2 log likelihood)	58871.2	58549.8	58539.6	55742.4	55134.9	55130.0	59465.7	58266.8	58262.4
χ^2 Difference test		321.4**	10.2^{ns}		607.5**	4.9^{ns}		1198.9**	4.4^{ns}
Δdf		13	7		13	7		13	7

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

Table 12. Differences in student-reported social integration, self-confidence and well-being for typical students in classes with students with behavioural, cognitive or other problems.

	Social integration (student)			Self-confidence (student)			Well-being (student)		
	$n = 12{,}410$			$n = 12{,}488$			$n = 12{,}484$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Variance									
School	0.01	0.00	0.00	n/a	n/a	n/a	0.02	0.02	0.02
Class	0.03	0.04	0.03	0.03	0.03	0.03	0.11	0.11	0.11
Student	0.91	0.91	0.91	0.94	0.89	0.89	0.84	0.81	0.81
Total	0.96	0.95	0.95	0.97	0.92	0.92	0.98	0.95	0.94
Division of variance									
School	1.2%			n/a			2.2%		
Class	3.6%			3.0%			11.7%		
Student	95.2%			97.0%			86.1%		
% Explained variance		1.04%	1.17%		4.92%	5.05%		3.24%	3.51%
Intercept	ns	ns	ns	0.05**	0.66**	0.65**	ns	−0.19†	ns
Gender (Ref = boy)		ns	ns		−0.24**	−0.24**		0.32**	0.32**
No. of students per school		ns	ns		ns	ns		0.00*	0.00*
Ethnicity (Ref = Dutch)									
Other		−0.15**	−0.15**		ns	ns		ns	ns
Moroccan		ns	ns		ns	ns		0.22**	0.22**
Turkish		−0.17**	−0.17**		ns	ns		ns	ns
Surinam/Antillean		ns	ns		ns	ns		ns	ns
Mixed		−0.10†	−0.10†		ns	ns		ns	ns
Parental education (Ref = higher ed.)									
Primary ed.		−0.18**	−0.18**		−0.42**	−0.42**		−0.17**	−0.17**
Lower voc. ed.		−0.13**	−0.13**		−0.50**	−0.50**		−0.13**	−0.13**
Voc. ed.		−0.08**	−0.08**		−0.29**	−0.29**		−0.05†	−0.01†

(*continued*)

Table 12. (*Continued*).

	Social integration (student)			Self-confidence (student)			Well-being (student)		
	$n = 12{,}410$			$n = 12{,}488$			$n = 12{,}484$		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Urbanisation (Ref = G4)									
Other		ns	ns		−0.23**	−0.23**		ns	ns
Rural		ns	ns		−0.25**	−0.24**		ns	ns
G27		ns	ns		−0.15*	−0.14†		ns	ns
Student with SEN in the class (Ref = no students with SEN)			ns			ns			ns
Student with behavioural problems (Ref = no students with behavioural problems									
>5% students with behavioural problems			ns			ns			ns
<5% students with behavioural problems			ns			ns			−0.12†
Student with cognitive problems (Ref = no students with cognitive problems)									
>5% students with cognitive problems			ns			ns			ns
<5% students with cognitive problems			ns			ns			ns
Students with other problems (Ref = no students with other problems)									
>5% students with other problems			ns			ns			−0.10†
<5% students with other problems			ns			ns			ns
Fit (−2 log likelihood)	34532.1	34447.8	34437.8	35012.9	34364.3	34353.1	34211.2	33775.8	33765.6
χ^2 Difference Test		84.3**	10.0^{ns}		648.6**	11.2^{ns}		435.4**	10.2^{ns}
Δdf		13	7		13	7		13	7

**$p \leq 0.001$, *$p \leq 0.01$, $^{\dagger}p \leq 0.05$, ns, non-significant; SEN, special educational needs.

social integration and self-confidence. On well-being, there were no differences between typical students in classes with and without students with SEN, but there were differences for type of SEN. Children in classes with less than 5% students with behavioural problems (est. -0.122, SE $= 0.055$, $t = -2.218$, $p = 0.027$) and children in classes with more than 5% students with other problems (est. -0.104, SE $= 0.053$, $t = -1.961$, $p = 0.050$) scored lower on well-being than students in classes with no students with behavioural or other problems. However, the model fit did not significantly improve, the effect sizes of these differences were small ($d = -0.123$ and $d = -0.105$) and the increase in explained variance was very small $R^2 = 0.27\%$.

Conclusions and discussion

We investigated the relation between inclusive education and the academic achievement and socio-emotional functioning of students without SEN, and whether this varied between more and less intelligent typical children. We also investigated whether the relation between inclusive education and the academic and socio-emotional functioning of typical students differed by the type of problems of the SEN students included in their class.

The results showed no differences in academic achievement between typical students in non-inclusive classes, typical students in classes with a few (less than 10%) students with SEN, and typical students in classes with more than a few (more than 10%) students with SEN. This indicates no overall relation between inclusive education and the academic achievement of typical students. As explained in the introduction, however, this general neutral relation could be caused by differential effects for more and less intelligent typical students. If the academic achievement of one group is positively influenced by inclusive education, and the academic achievement of another group is negatively influenced, the average effect will be neutral. A more important finding of this study, therefore, was that there were no indications of a different relation between inclusive education and academic achievement for more and less intelligent typical students.

Similar results were found on different aspects of socio-emotional functioning: on the great majority of measures, no differences were found between typical students in non-inclusive classes, in classes with a few students with SEN and in classes with more than a few students with SEN. Only for student-reported self-confidence did typical students in classes with more than a few students with SEN seem to score better than typical students in non-inclusive classes. This might be because students with SEN generally perform less well than typical students. Typical students in inclusive classes could probably compare themselves with students who function less well than themselves, which could have a positive effect on their self-confidence. However, because the effect size and the amount of explained variance were small, the practical importance of this relation is unclear. Furthermore, there was no apparent differential effect of inclusive education on the socio-emotional functioning of more and less intelligent typical students. We did find an interaction effect for teacher-reported effort, but because the effect size and the amount of explained variance were small, and the model fit did not significantly improve, the relevance of this difference is uncertain. Earlier research provides little evidence on the effects of inclusion on the socio-emotional functioning of typical students, whereas inclusive education could affect these factors positively or negatively. Our research found

indications that inclusive education has no relation with the socio-emotional functioning of typical students: overall, there were no meaningful differences between typical students in inclusive and non-inclusive classes, and possible effects did not seem to be covered by a different relation for more and less intelligent typical students.

Finally, no important differences in the academic achievement and socio-emotional functioning of typical students were found when children with behavioural, cognitive or other problems were included in their class. The only differences on self-reported well-being indicated that students in classes with one (i.e. less than 5%) student with behavioural problems or one or more (i.e. more than 5%) students with other problems experienced less well-being than typical students in classes without students with these specific problems. This might be because students with SEN demand more teacher attention, or affect the class climate in a negative way. However, these differences had small effect sizes, a small amount of explained variance and did not yield better model fit, so their practical importance was unclear. These results indicate that for typical students, it did not seem to matter which problems included SEN children have: overall, there seemed to be no meaningful relation between inclusion of children with different types of SEN and the academic achievement and socio-emotional functioning of typical students.

In addition to the small effect sizes and explained variances of the three differences that were found, there is another reason to be very careful with interpreting these findings. In this study, we used 11 dependent variables, on which we performed a large number of statistical tests. It is possible that these differences appeared because of inflated family-wise error rate: when you perform many statistical tests, you can always expect some of them to yield significant results.

This study had some limitations. First of all, it is not possible to draw causal inferences from the research. We performed correlational analyses on cross-sectional data. This method allows one to see differences or lack of differences between groups, but it is not possible to conclude that inclusion caused or did not cause these differences. For example, there might have been pre-existing differences between inclusive and non-inclusive classes. To overcome this problem, experimental research should be carried out. Also, longitudinal research following children in inclusive and non-inclusive classes would be worthwhile.

The students included in the study might be students with less severe types of SEN. As described earlier, special schools coexist with inclusive education in the Netherlands, so schools might include students with relatively mild SEN, while rejecting students with more severe SEN. Moreover, regular schools get additional funding for educating children with diagnosed SEN, creating an incentive to diagnose a child with relatively mild problems as having SEN. We were not able to compare our sample of students with SEN with students in special education, because this information is not available in the sixth measurement of PRIMA. However, because we only considered children with an official diagnosis as having SEN, and children with more severe SEN are more often diagnosed, both children with mild and more severe SEN were represented in our sample.

There was one drawback to including only students with diagnosed SEN in the definition: students who had SEN but who did not have a diagnosis were not classified as having SEN. This was a problem because not every student with SEN is diagnosed. Some might not be diagnosed for practical reasons such as waiting lists or

school budgets, while others might not be diagnosed because their parents refused to give permission for psychological testing. It is possible, therefore, that some students with SEN were classified as students without SEN in this study, but because the diagnose definition is more objective than just asking teachers which students have SEN, we chose this definition.

We only made a distinction between children with cognitive, behavioural and other problems. This concerns the type of SEN a child has but does not indicate how severe that problem is. Cognitive problems, for example, included children with language and arithmetic difficulties, children with dyslexia and dyscalculia and children with developmental delay. Inclusion of children with mild cognitive problems or more severe cognitive problems might have a different impact on the children without SEN. Our large-scale dataset did not permit us to assess the severity of the SEN from the problem a child had. There can be large differences between children with diagnosed dyslexia, for instance. We therefore chose only to distinguish different types of SEN.

Another limitation was that we did not know how inclusive education was being implemented in each school. Schools might have been making different arrangements for the inclusion of children with SEN and these arrangements might also have affected typical children. To investigate these processes, qualitative research would have been more suitable than quantitative research. Nevertheless, because all schools were Dutch schools, working under the same legislation and with the same budgetary constraints, differences between schools would not be irreconcilable. This is supported by the small amount of variance found at school level: for the measures for which school level was significant, the variance at this level ranged from 1.0% to 10.6%, and the average was 3.04%.

Finally, this study investigated the relation between inclusive education and the functioning of typical students. Possible effects on teachers and on students with SEN were not studied. However, inclusive education might also affect teachers: they may consider inclusive education more demanding than educating typical students only. When evaluating inclusive education, these effects should also be taken into account. The topic of inclusion and students with SEN is covered in another article by the same authors.

Despite these limitations, the main findings in this study still hold. We found no evidence concerning our hypothesis on the frequently found neutral effects of inclusive education on the academic achievement of typical students: neutral results of inclusive education did not seem to be caused by a differential effect for more and less intelligent typical students. We found no evidence for a relation between inclusive education and academic achievement for either group. Furthermore, inclusive education seemed to have no important relation with the socio-emotional functioning of typical students and the relation between inclusive education and the functioning of typical students did not seem to vary by the type of SEN of the included students.

It seems unlikely that a lack of power covered differences between typical students in inclusive and non-inclusive classes. Much educational science research into SEN has used relatively small samples. When small differences are being investigated, as is often the case in educational science, they are hard to detect with a small sample but our research was based on a large-scale study. Even small differences between typical students in inclusive and non-inclusive classes, where present, would therefore have been detected. The large scale of this study also offered

the opportunity to control for many background variables, which have often been shown to affect students' functioning at school.

The findings of this study are interesting in the light of the ongoing inclusion debate. In the introduction, we described different arguments in favour of and against inclusive education. Many of these arguments concern the effects on typical students. For example, inclusion might adversely affect the achievement of typical children, or typical children might copy undesirable behaviour from children with SEN. With the findings of this study, we gained more support to contest these arguments. This research strengthens the scientific evidence in support of inclusive education. Earlier research had already indicated overall neutral or positive effects of inclusion (Kalambouka et al. 2007; Ruijs and Peetsma 2009). This study supports this earlier research, especially by finding no evidence for an alternative explanation for neutral academic effects for typical children. The international trend towards inclusive education seems, therefore, to be increasingly justified by empirical evidence.

Notes

1. CITO is a Dutch institute for testing and assessment. They develop standardised tests for education.
2. We checked whether there was a sufficient number of students in each combination of IQ and % SEN students. Students were well distributed over these cells.
3. School level for self-confidence: teacher-reports: $\chi^2(1) = 2.403$, $p = 0.121$; student-reports: $\chi^2(1) = 3.141$, $p = 0.076$.
4. School level for student-reported self-confidence: $\chi^2(1) = 3.097$, $p = 0.078$.

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